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(54) **HEAT EXCHANGER AND HEAT PUMP APPARATUS**

(57) A heat exchanger and a heat pump device that, with a small number of components, are capable of sending a refrigerant in a direction in which a plurality of heat transfer tubes are disposed side by side, the plurality of heat transfer tubes being connected to a header. An outdoor heat exchanger (11) includes a liquid header (30). The liquid header (30) includes a first liquid-side member (31) that includes a liquid-side flat-tube connection plate (31a) to which a plurality of flat tubes (28) are connected, a seventh liquid-side member (37) that includes a liquid-side external plate (37a) positioned on a side opposite to the flat tubes (28), and a fourth liquid-side member (34) that includes a fourth internal plate (34a) positioned therebetween. The fourth internal plate (34a) includes a first penetrationportion (34o) extending in a direction in which the plurality of flat tubes (28) are disposed side by side. The first penetrationportion (34o) has an introduction space (34x), a nozzle (34y), and an ascending space (34z) that are disposed side by side in order in the direction in which the plurality of flat tubes (28) are disposed side by side. The width of the nozzle (34y) is smaller than the width of the introduction space (34x) and is smaller

than the width of the ascending space (34z).

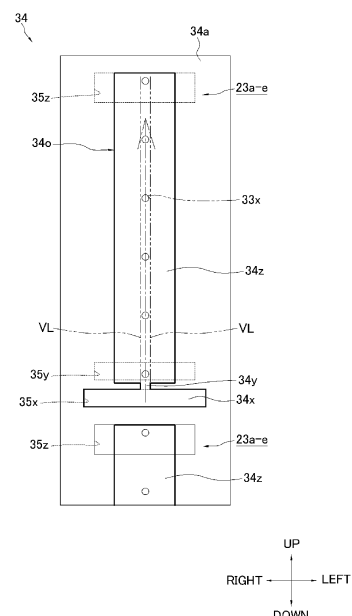


FIG. 14

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DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
X	EP 2 998 680 A1 (MITSUBISHI ELECTRIC CORP [JP]) 23 March 2016 (2016-03-23) * figure 5 *	1-12	INV. F25B39/00 F28F9/02 F28F9/22
X	WO 2018/116413 A1 (MITSUBISHI ELECTRIC CORP [JP]) 28 June 2018 (2018-06-28) * figures 3, 11 *	1-3	
A	US 2015/300758 A1 (HOFMANN HERBERT [DE] ET AL) 22 October 2015 (2015-10-22) * figure 3 *	1	
A	CN 203 940 771 U (MITSUBISHI ELECTRIC CORP) 12 November 2014 (2014-11-12) * figure 17 *	1	
			TECHNICAL FIELDS SEARCHED (IPC)
			F28F
The present search report has been drawn up for all claims			
Place of search		Date of completion of the search	Examiner
Munich		21 November 2024	Martínez Rico, Celia
CATEGORY OF CITED DOCUMENTS			
X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document			
T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document			

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EP 24 20 2147

5 This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report.
The members are as contained in the European Patent Office EDP file on
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21-11-2024

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
EP 2998680 A1	23-03-2016	CN 203940770 U	12-11-2014
		EP 2998680 A1	23-03-2016
		JP 6005268 B2	12-10-2016
		JP WO2014184918 A1	23-02-2017
		WO 2014184918 A1	20-11-2014

WO 2018116413 A1	28-06-2018	CN 110073154 A	30-07-2019
		EP 3561412 A1	30-10-2019
		ES 2900343 T3	16-03-2022
		JP 6782792 B2	11-11-2020
		JP WO2018116413 A1	27-06-2019
		US 2020072507 A1	05-03-2020
		WO 2018116413 A1	28-06-2018

US 2015300758 A1	22-10-2015	CN 104848710 A	19-08-2015
		DE 102014203038 A1	20-08-2015
		US 2015300758 A1	22-10-2015

CN 203940771 U	12-11-2014	NONE	
